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Our Vision – Healthy Kansans living in safe and sustainable environments

Neodesha Refinery Site

Public Meeting
August 28, 2008 at 7:00 PM
W. A. Rankin Memorial Library
Neodesha, Kansas

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Introductions

- Chris Carey, Project Manager
- E. Jean Underwood, Chief, Site Remediation Unit
- Rick Bean, Chief, Remedial Section
- Gary Blackburn, Director, Bureau of Environmental Remediation
- Bill Morris, Vapor Intrusion Expert
- D. Charles Hunt, Interim State Epidemiologist
- Maggie Thompson, Director of Communications

Purpose

- Update the community on the status of the Neodesha Refinery Site
- Obtain a better understanding of community concerns
- Obtain the public's input on future community involvement activities

Agenda

- KDHE and EPA Process for Contaminated Sites
- Background – Investigations and Interim Measures
- Future Actions
- Community Involvement
- Vapor Intrusion
- Questions and Discussion

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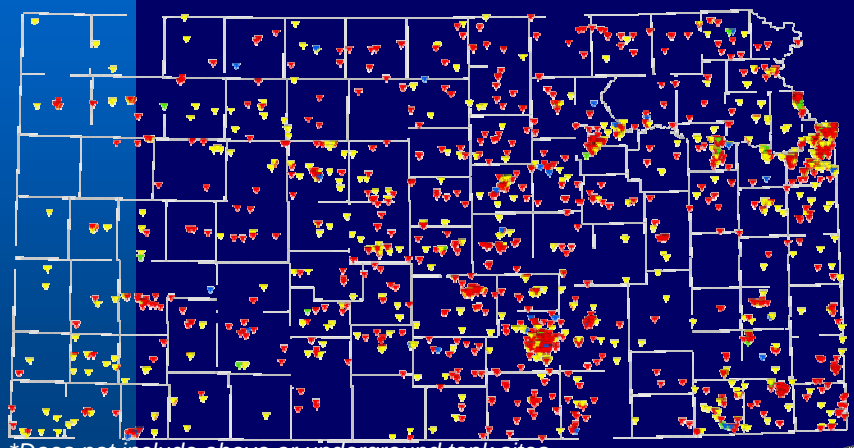
Contaminated Sites in Kansas*



**Does not include above or underground tank sites*

Federal Law - National Oil and Hazardous Substances Pollution Contingency Plan - "NCP"

- Establishes the process to address contaminated sites across the nation
- Establishes the acceptable range of risk for carcinogens and non-carcinogens
- For carcinogens the acceptable level is 10^{-4} to 10^{-6} or in other words 1 in 10,000 to 1 in 1,000,000

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State Cleanup Programs

- State program mirrors federal system
- 2001 – Memorandum of Understanding with KDHE and EPA
- 1997 KDHE established a stakeholder committee - 13 committee members and KDHE
- Developed regulations which discuss acceptable risk in Kansas – 28-71-11
- For carcinogens the acceptable level is 10^{-5} or 1 in 100,000 which is within EPA's acceptable range of risk
- Risk-Based Standards for Kansas Manual

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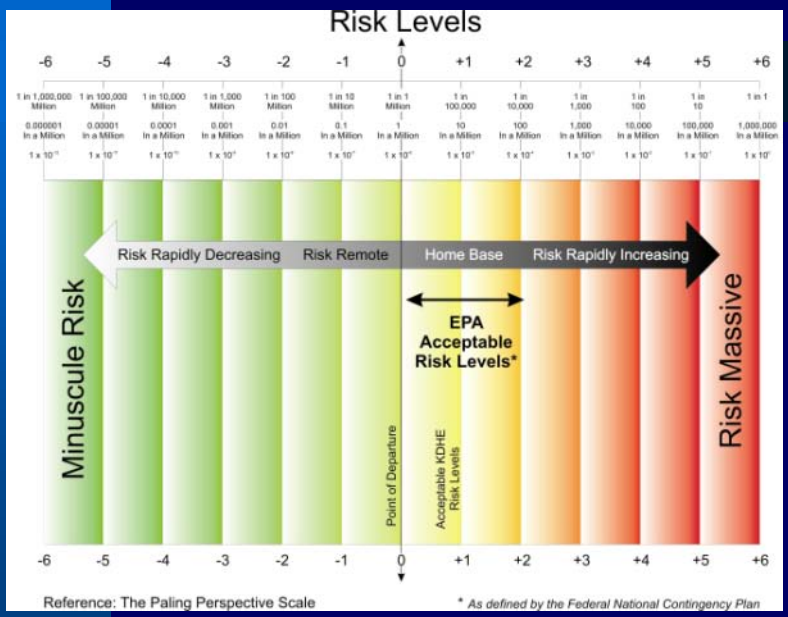

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Media Commonly Evaluated

- Groundwater
- Soil (Surface and/or Sub-Surface)
- Surface Water
- Sediment
- Air (Indoor/Ambient)
- Biota

Common Exposure Pathways

- **Ingestion**
  - Are people drinking contaminated water?
  - Are people eating contaminated soil?
  - Are people eating contaminated fish or plants (e.g., garden produce)?
- **Dermal (Direct) Contact**
  - Are people coming in skin contact with contaminated soil?
  - Are people coming in skin contact with contaminated water?
- **Inhalation**
  - Are people breathing contaminated air?

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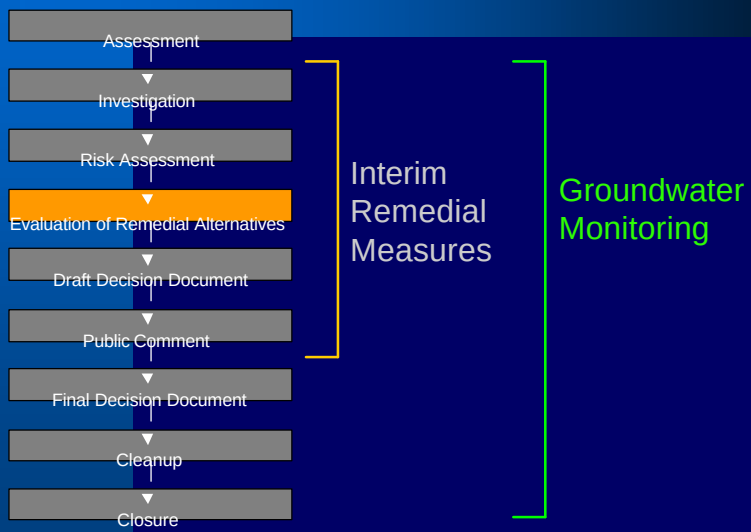
Duration of Exposure and Exposure Concentration

- Other factors that are evaluated include the level of contamination present and the length of time an individual is exposed to the contamination.
- Short-term exposure versus long-term exposure
- Exposure concentrations

Generalized Process to Address a Contaminated Site



Nine Criteria For Evaluating Remedial Alternatives

- Threshold Criteria
  1. Protection of Human Health and the Environment Within the Acceptable Range Defined by Federal and State Law
  2. Compliance with existing Federal and State Laws, Regulations and Requirements
- Balancing Criteria
  3. Long-Term Effectiveness and Permanence
  4. Reduction of Toxicity, Mobility, or Volume through Treatment
  5. Short-Term Effectiveness
  6. Implementability
  7. Cost
- Modifying Criteria
  8. Community Acceptance
  9. State Acceptance

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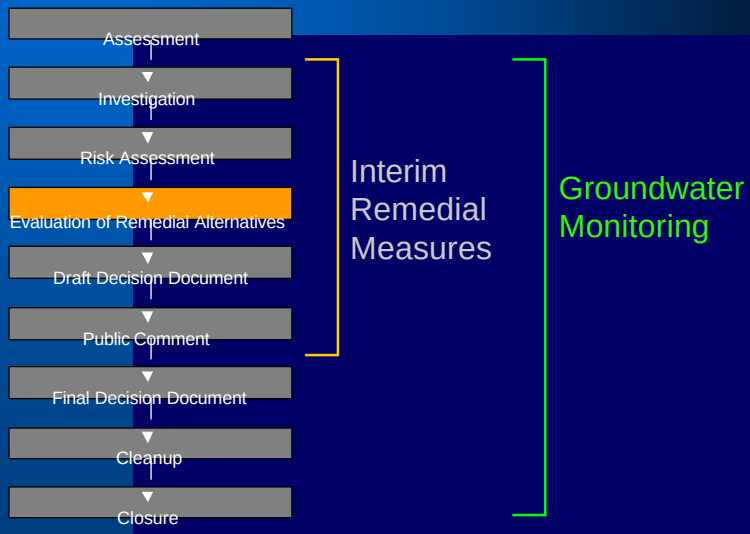
Generalized Process to Address a Contaminated Site



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Site History

- Refinery operated from 1897 until 1970
- Site identified in 1980 during a KDHE inspection of a sludge disposal pond north of Granby Road
- Contamination at the north site and southern settling basins was addressed
- Additional site investigations were conducted by Amoco and KDHE during the 1980s

Site History

- Consent Order between KDHE and Amoco in 1990
- Multi-phased Remedial Investigation from 1990-2000
- Human Health and Ecological Risk Assessment (Approved 2003)
- Corrective Action Study (Approved 2005)
- Additional data collection in support of ongoing litigation (2006-2007)
- Routine groundwater and surface water monitoring since 1991

Site Description

- Refinery facility covered approximately 300 acres
- Currently used as an industrial park
- Residential properties are located east and northwest of the refinery
- Fall River is located west of the refinery
- Verdigris River is east of Neodesha

Refinery Operations

Drinking Water Quality

- The City of Neodesha's drinking water comes from the Fall River. The City's water intake is downstream of the former refinery.
- KDHE's Bureau of Water mandates frequent testing of drinking water supplies.
- No refinery-related contaminants were detected above federal drinking water standards in samples collected in March/May 2008.

General Investigation Findings

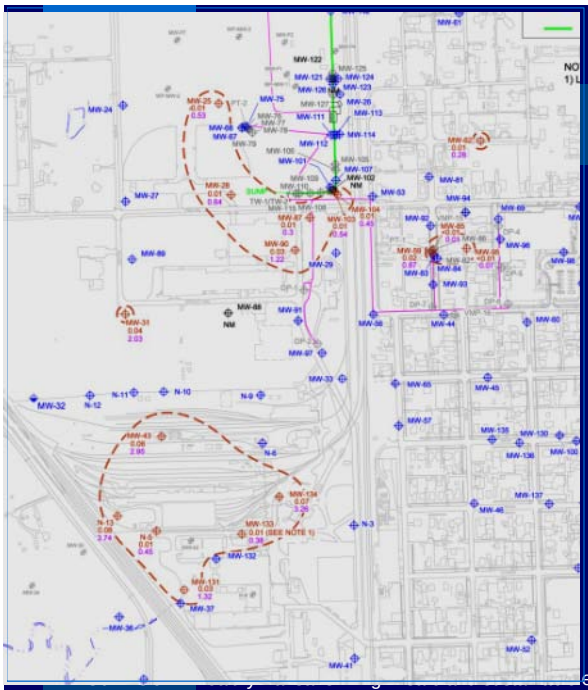
- Free product (petroleum hydrocarbons)
- Benzene and other petroleum constituents in soil and groundwater
- Arsenic
- Chlorinated VOCs in groundwater*
- Refrigerants in groundwater*

*These constituents are associated with other sites in Neodesha and are not attributable to historical refinery operations

October 2007 Groundwater Data*

Contaminant	Concentration	Cleanup Goals
Benzene	16,300	5
Toluene	26,800	1,000
Ethylbenzene	5,020	700
Xylene	26,200	10,000
Naphthalene	1,170	3
Arsenic	72.2	10

* Other constituents were also detected in the October 2007 groundwater samples; these data are available in the October 2007 Semiannual Groundwater Monitoring Report (ENSR 2008)



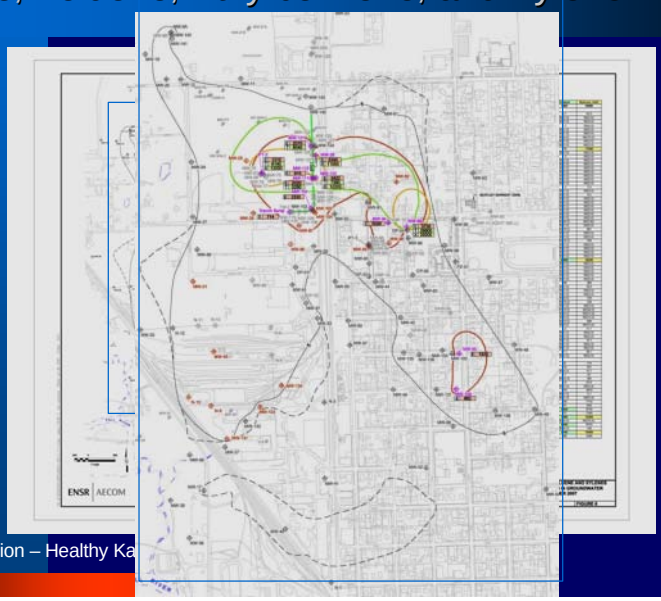
Where is the contamination?

Free Product

environments

Where is the contamination?

Benzene, Toluene, Ethylbenzene, and Xylene



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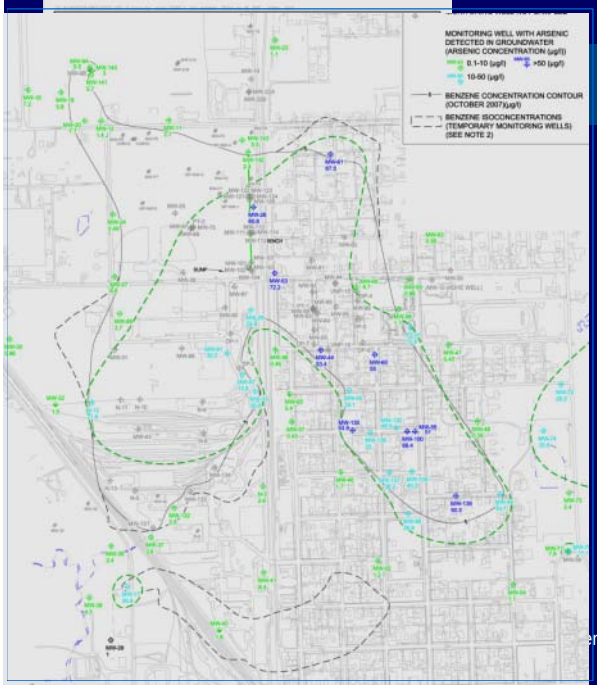


Where is the contamination?

Arsenic

We know the contamination is here, but what is being done about it?

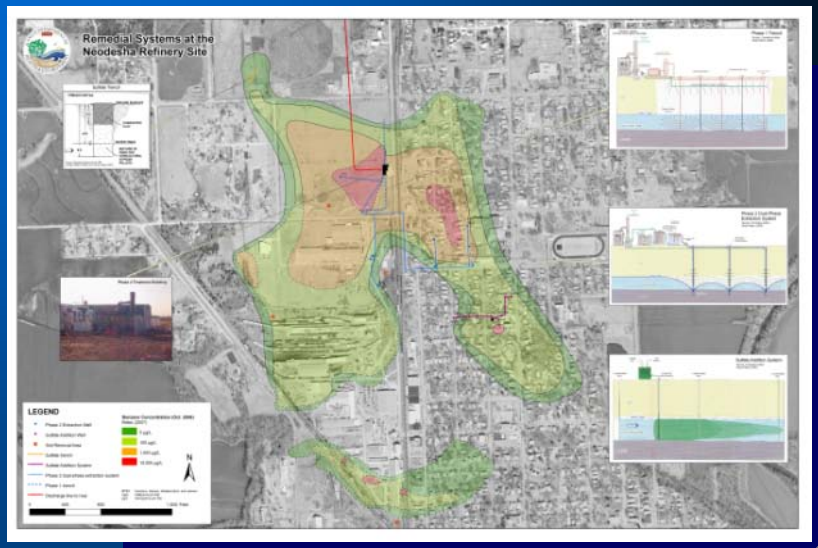
Interim Measures

- What are interim measures?
- Are interim measures intended to be the final actions taken at a site?
- What interim measures have been undertaken at the Neodesha Refinery Site?
- How effective are the current interim measures?

Current Interim Measures

- Phase 1 Trench – Air Sparge Trench
- Phase 2 System – Dual Phase Extraction
- Sulfate Addition System
- Sulfate Trench
- Excavation in hydrocarbon seep areas

Current Interim Measures



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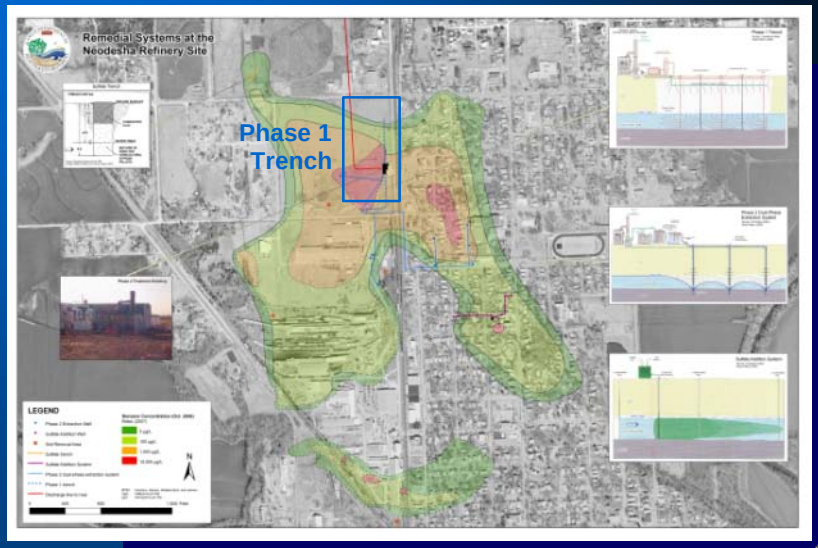
Current Interim Measures



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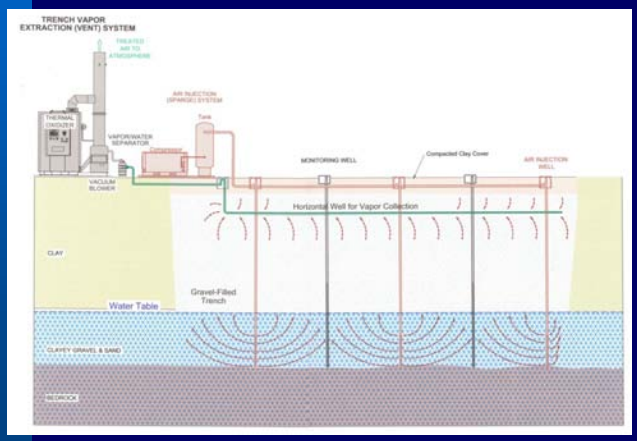
Phase 1 System - Trench



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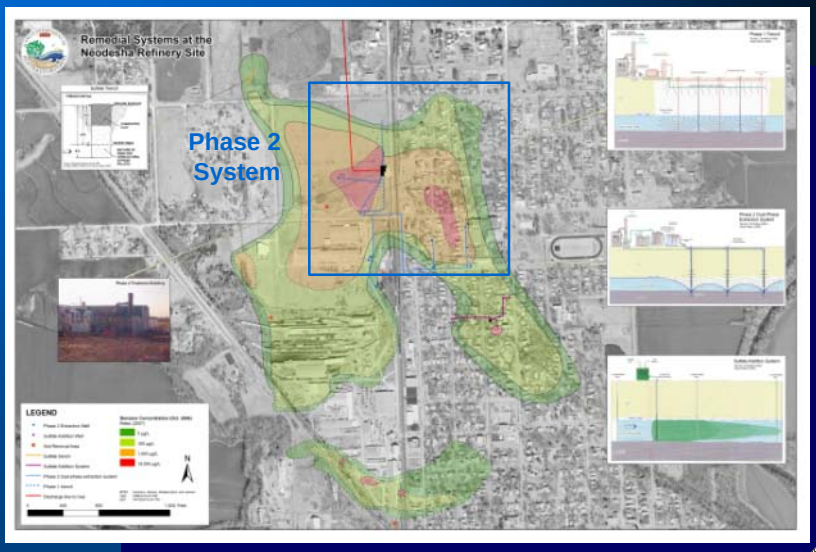
Current Interim Measures



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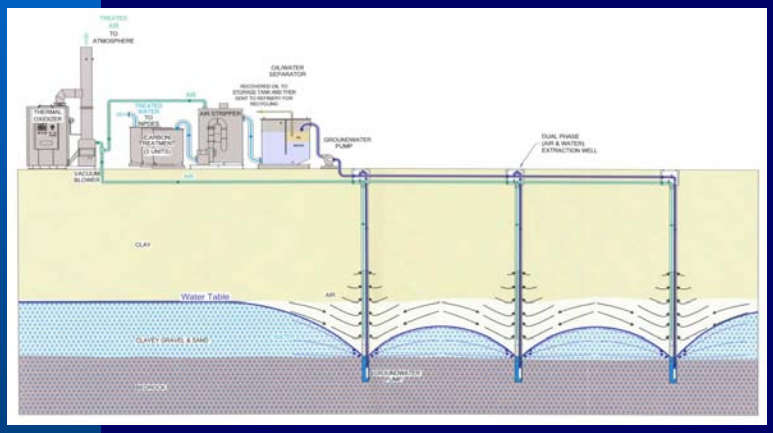
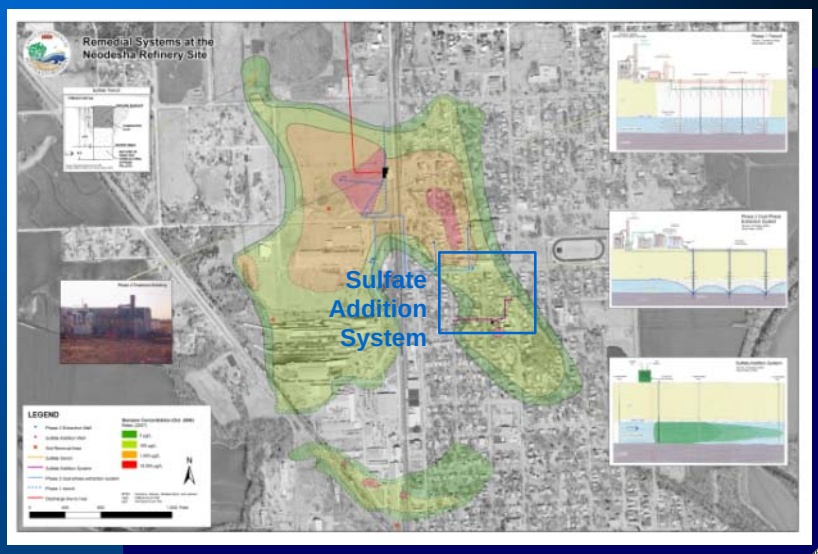
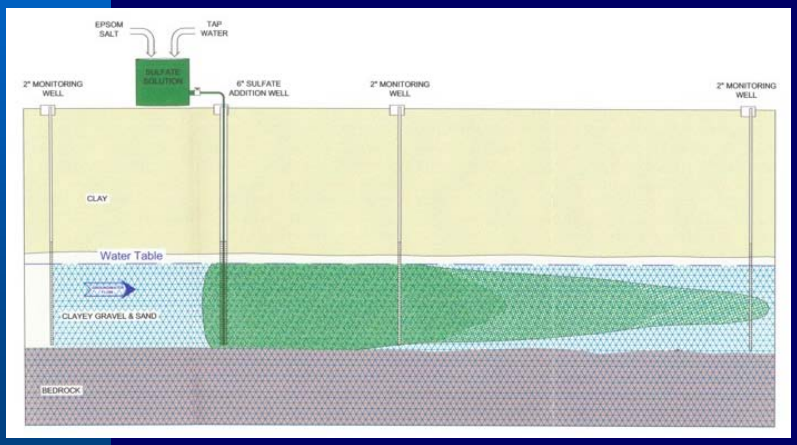
Phase 2 System



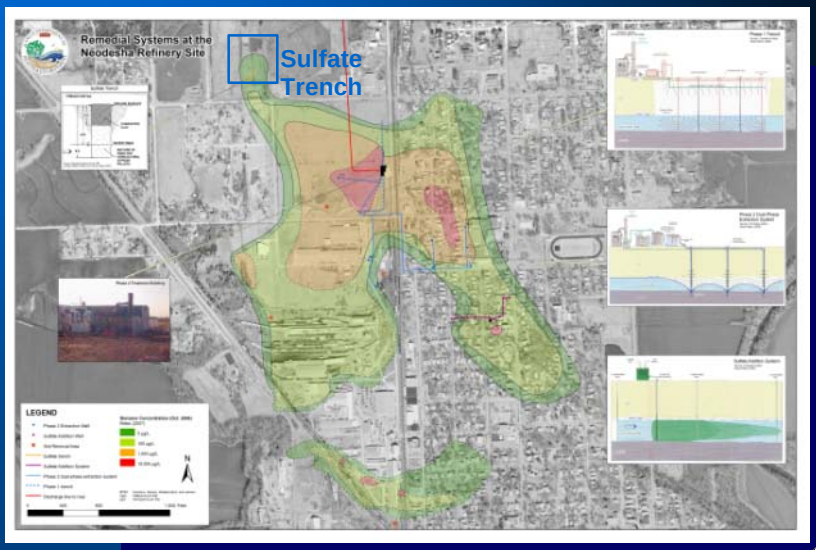
Current Interim Measures



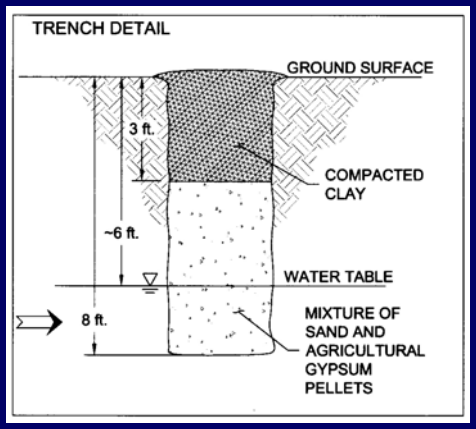
Sulfate Addition System



Current Interim Measures



Sulfate Trench



Interim Measure Results

- 78,237 gallons of product removed*
- 163,942,000 gallons of groundwater treated*
- Excavation in hydrocarbon seep areas
- Sulfate system performance looks promising; however, additional monitoring is needed

*These values do not account for contaminant reduction resulting from *in-situ* processes such as bioremediation or air sparging

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Future Investigative Actions

- Installation and sampling of approximately 34 new monitoring wells
- Soil sampling at 35 locations at and near the former refinery
- Sediment sampling in Fall River at 14 locations
- Surface water sampling in Fall River at 14 locations
- Continued groundwater monitoring

Future Interim Measures

- Free product recovery – vacuum enhanced oil recovery
- Limited excavations within industrial park
- Pilot testing in support of revised Corrective Action Study

Next Steps

- Conduct additional sampling and issue investigation report (BP) – Fall 2008
- Interim Measure Implementation (BP) – Fall 2008
- Revised Corrective Action Study (BP) – Spring 2009
- Draft Corrective Action Decision (KDHE) – Spring/Summer 2009
- Public Comment – Summer 2009
- Final Corrective Action Decision – Fall 2009

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Community Involvement

- To ensure that the public's interests are represented in future remedial actions, KDHE has elected to prepare an updated Community Involvement Plan for the Neodesha Refinery Site.
- This new plan will describe the type and frequency of future community involvement activities.

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Community Involvement Plan Development Process

- Review of site files and historical community involvement activities
- Interviews with members of the community
- Evaluation of interview results
- Creation of a plan reflective of the community's interest level.

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Potential components of the Community Involvement Plan

- Citizens Advisory Group
- Public meetings or availability sessions
- Fact sheets/mass mailings
- Press releases to local media
- Workshops to explain pertinent environmental issues
- One-on-one meetings with interested parties
- Establishment of a KDHE-maintained information repository in Neodesha

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Mailing List

If you would like to be included on the official site mailing list, please be sure to add your name to the list at the back of the room.

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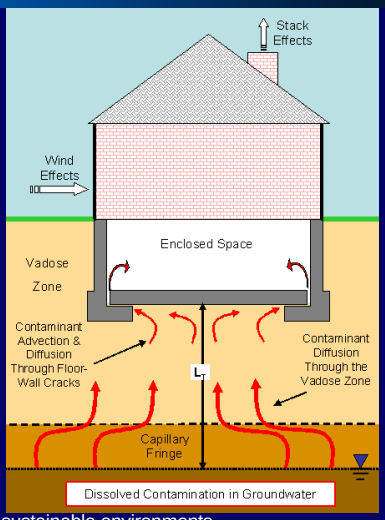
What is Vapor Intrusion?

Volatile Organic Compounds (VOCs) migration from the subsurface into overlying buildings.



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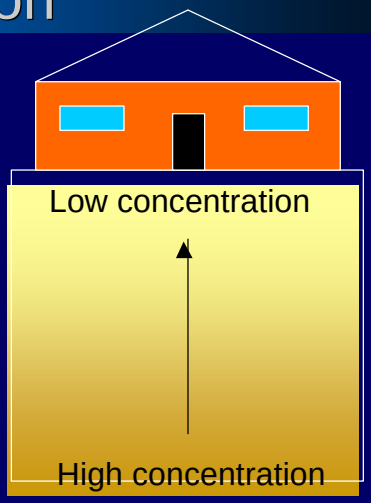
Process - Diffusion

- Slow process
- Gradient
- Advection and diffusion take place near the foundation



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Timeline

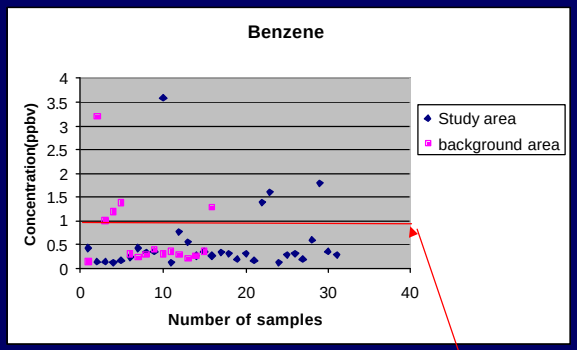
- May 2000 – BP/KDHE indoor air sampling
- Dec. 2004 - KDHE limited indoor air, soil gas and sub-slab sampling
- Feb. 2008 - KDHE vapor intrusion assessment of school buildings
- Jun. 2008 - KDHE sub-slab sampling at other basements in the area

Interpreting Indoor air data

- Background contributions
  - Outdoor ambient air
  - Indoor air sources
- Common products contain VOCs
  - Personal activities within the building
  - Household & commercially available products
  - Building materials & furnishings
  - Smoke (cigarettes, combustion related)
  - Sorptive interactions

2000 Data

- Indoor
- Outdoor air
- Basement and crawlspace sampling
- BTEX only



KDHE RSK value for Benzene 0.82 ppbv

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2004 Data

- Limited indoor air sampling
  - Soil gas
  - Sub-slab sampling (additional tool to discern background)
- Full VOCs
- Primarily downgradient of Airosol
- One house and Heller Elementary School sampled

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2004 Data con't

- Numerous detections found in the indoor air, soil gas and sub-slab samples.
- Benzene found in the the first floor and basement of the house and the basement of Heller grade school above risk levels
- Benzene not detected in either sub-slab
- Acetone and refrigerants detected in sub-slabs
  - Were the highest detections of all compounds

February 2008 Data

- Request made by USD 461 to evaluate the High school and Heller Grade school for possible vapor intrusion
- Feb. sampling in High/Jr. school, Heller Elementary and North Lawn Elementary (control)
  - Indoor air, outdoor air, and sub-slab samples
  - Full VOCs

February 2008 Data con't

- There were 23 indoor air samples collected from 22 school rooms
- 57 VOCs analyzed in each room
  - 1311 reported data results
  - 260 detections (19.8%)
  - 8 above RSK indoor air screening levels from 5 rooms (1-Northlawn, 1-Jr. High, 1-High school, 2-Heller)

February 2008 Data con't

- 8 sub-slabs collected from 6 ports
  - 456 total analytes, 63 detections (13.8%), 0 above RSK
- 5 Outdoor ambient samples
  - 285 total analytes, 49 detections (17.2%), 0 above RSK

February 2008 Data con't

- Six sub-slab sampling ports installed in High/Jr. High school and Heller Grade school
  - Petroleum hydrocarbons not detected or very low in sub-slab
  - Chlorinated solvents and refrigerants in sub-slab of Heller grade school basement
- Re-sampling winter '08 (Nov.)

June 2008 Data

- Re-sampled in June as part of an investigation of Airosol
- Sub-slab sampling only
  - Grade school, church, two homes
- Full VOCs
- No petroleum hydrocarbon detects
- Significant increase in refrigerants

Wrap up

- Vapor intrusion currently not a problem
- Petroleum hydrocarbons should not be a vapor intrusion problem in the future
- Chlorinated solvents and refrigerants seem to be increasing downgradient of Airosol.
- Continued monitoring likely

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Other Questions or Comments?

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